

Editorial: Interconnected Sustainability Challenges in Agriculture, Climate, and Conservation

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Abstract

Agricultural production, biodiversity, natural-resource management, climate change, and human livelihoods are increasingly interconnected, creating sustainability challenges that cannot be effectively addressed through isolated disciplinary approaches. Agricultural expansion and unsustainable intensification can contribute to biodiversity loss and resource degradation, while climate change increasingly threatens food production, ecosystem functioning, and the resilience of communities dependent on natural resources. At the same time, conservation and climate responses can generate important implications for agricultural productivity, livelihoods, and food security. Addressing these interdependencies requires systems-oriented research capable of identifying trade-offs, synergies, feedbacks, and pathways toward sustainable and resilient development. This editorial introduces *SustainaTerra: Research in Agricultural and Environmental Sustainability* as an interdisciplinary platform dedicated to advancing scientific knowledge on these interconnected challenges. The journal encompasses three complementary areas: sustainable agriculture and food systems; biodiversity conservation and natural-resource management; and environmental and climate-change mitigation and adaptation. *SustainaTerra* welcomes rigorous empirical studies, innovative methodological and modelling approaches, systematic reviews, and applied and policy-relevant research from diverse geographical and socioeconomic contexts. By bringing agricultural, ecological, environmental, and social perspectives into dialogue, the journal seeks to promote evidence-based understanding and solutions that strengthen the resilience, sustainability, and equity of agricultural and environmental systems. *SustainaTerra* invites researchers and practitioners to contribute knowledge that can support transformative pathways toward sustainable food systems, healthy ecosystems, and resilient communities.

Keywords Sustainable agriculture; Sustainable food systems; Biodiversity conservation; Natural resource management; Climate change adaptation; Climate change mitigation; Environmental sustainability; Sustainability science

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Rationale

Sustainability problems spanning agriculture, climate, biodiversity, and livelihoods form a tightly coupled system in which interventions in one domain generate feedbacks across the others [1–3]. Agricultural intensification drives biodiversity loss and resource depletion; climate change disrupts food production and ecological function; and conservation strategies simultaneously shape rural livelihoods and agricultural resilience [4–6].

Agriculture's Impact on Biodiversity and Natural Resources

Intensive agricultural expansion and mechanization have caused large-scale biodiversity loss, soil degradation, water pollution, and habitat

destruction, rendering agricultural landscapes less resilient [4,7]. Monocultures displace local foods and traditional practices, increasing systemic risk and reducing agrobiodiversity [4,8]. Agricultural systems exceed planetary boundaries through high water consumption, land-use change, and reduction in soil fertility [9]. Biodiversity underpins essential ecosystem services for agriculture, for instance: pollination, nutrient cycling, natural pest control, and watershed maintenance, yet intensification systematically removes the wild species providing these functions [10–12].

Climate Change Effects on Food Systems

Climate change directly reduces crop yields, shifts species distributions, and disrupts food supply, with agricultural yields in Africa projected to decline by more than 30% by 2050 [5,10]. Species ranges have shifted to

higher elevations at a median rate of 11.0 m per decade and to higher latitudes at 16.9 km per decade, with extinction rates reaching 38–52% under no-migration scenarios [10]. Extreme weather events damage infrastructure and interrupt supply chains, making food system resilience dependent on stable access to water, energy, and transport — each increasingly affected by climate change [2]. Communities dependent on rain-fed agriculture are particularly vulnerable, and some countries face double jeopardies in both fisheries and agriculture sectors simultaneously [1,10]. It is therefore important to understand the current and future manifestations of climate change; especially in developing countries where strong population growth simultaneously implies very high needs for food products.

Advancing Agricultural and Environmental Sustainability: The Vision of SustainaTerra

Nexus and systems-thinking approaches, encompassing water, energy, food, biodiversity, and health, are increasingly proposed to address the interconnected nature of these sustainability challenges [2,13]. These frameworks emphasize that sectoral adaptation strategies risk masking cross-sector trade-offs and synergies, urging a shift toward systemic resilience. Effective implementation requires governance innovation, stakeholder participation, and coherent cross-sector policies that simultaneously address food security, biodiversity conservation, and climate adaptation. Transformative policy interventions must operate through interconnected institutions from local to global levels, fostering interlinked human, ecosystem, and planetary health [14,15].

The challenges of sustainable development are increasingly shaped by the complex interactions between agricultural production, environmental change, biodiversity loss, natural-resource degradation, and climate change. Growing pressures on land, water, ecosystems, and food systems require approaches that move beyond isolated disciplinary perspectives and recognize the interconnected nature of environmental and societal challenges. It is within this context that SustainaTerra: Research in Agricultural and Environmental Sustainability, is established as a platform for advancing scientific knowledge on the sustainable management of agricultural systems, natural resources, and the environment. The journal recognizes that the sustainability of food systems cannot be separated from the conservation of biodiversity and natural resources, nor from the need to mitigate and adapt to climate change. Accordingly, SustainaTerra welcomes research spanning sustainable agriculture and food systems, biodiversity conservation and natural-resource management, and environmental and climate-change mitigation and adaptation.

The journal therefore seeks to provide an interdisciplinary space where these relationships can be investigated through robust empirical evidence, innovative methodologies, modelling and analytical approaches, systematic reviews, and applied and policy-relevant research. We particularly welcome studies that connect scientific knowledge with practical sustainability challenges and that contribute to understanding, measuring, evaluating, or improving the resilience and sustainability of agricultural and environmental systems. SustainaTerra is geographically open and welcomes contributions from all regions and contexts, recognizing that sustainability challenges are experienced differently across ecosystems, economies, and communities. Research grounded in local and regional realities, including those of developing and rapidly changing environments, is especially valuable when it generates insights with broader scientific or practical relevance. Across all contributions, the journal is committed to scientific rigor, methodological transparency, reproducibility, responsible interpretation of evidence, and interdisciplinary dialogue. We believe that meaningful progress toward sustainability requires not only new technologies and practices, but also a deeper understanding of the interactions among people, agriculture, ecosystems, and the

changing environment. SustainaTerra therefore invites researchers, practitioners, institutions, and policymakers to contribute rigorous and relevant knowledge that can help advance more productive, resilient, equitable, and environmentally sustainable agricultural and natural-resource systems.

Declarations

Author contributions

Hans Fumba Murangaza and Dieudonné Bahati Shamamba: Conceptualization, Methodology, Formal analysis, Investigation, Data curation, Visualization, Writing – original draft, Writing – review & editing.

Conflict of interest

The authors declare that they have no conflicts of interest. Although the Handling Editor is among the authors of this editorial, the manuscript was subject to an internal peer-review process conducted independently of the Handling Editor. This arrangement was adopted to ensure an impartial assessment of the editorial content.

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